

***RHYPAROCHROMUS SATURNIUS* (ROSSI) (HETEROPTERA:
LYGAEOIDEA: RHYPAROCHROMIDAE), A PALEARCTIC SEED
BUG NEWLY DISCOVERED IN NORTH AMERICA**

THOMAS J. HENRY AND DAVID ADAMSKI

Systematic Entomology Laboratory, Plant Sciences Institute,
Agricultural Research Service, United States Department of Agriculture,
% National Museum of Natural History, Washington, D. C. 20560-0168

Abstract.—The Palearctic rhyparochromid *Rhyparochromus saturnius* (Rossi) [Lygaeoidea] is reported for the first time in North America based on collections from 17 counties in California. Literature pertaining to this adventive species is reviewed, notes on its habits are given, and descriptions and photographs of the adult and fifth-instar nymph are provided to help distinguish it from other North American Rhyparochromidae. It is speculated that *R. saturnius* was introduced in international commerce originating from the Mediterranean Region, most likely Italy or nearby countries.

Key words: Heteroptera, Lygaeoidea, Rhyparochromidae, *Rhyparochromus saturnius*, North America, new record, California.

In April of 1998, three specimens of a rhyparochromid, collected in San Joaquin County, California, were submitted to the Systematic Entomology Laboratory (Agricultural Research Service, United States Department of Agriculture, Washington, D. C.) for identification. They proved to be *Rhyparochromus saturnius* (Rossi), a southern European species not known to occur in North America. Although the establishment of this species could not be confirmed based on these few specimens, additional evidence kindly provided by Larry A. Allen, an entomologist with the San Joaquin County Department of Agriculture, suggested that naturalized populations of this Palearctic species were present in at least one central California county.

In this paper, we give the first North American records for *R. saturnius*, review the literature pertaining to it, give notes on habits, and redescribe and provide photographs of the adult and fifth-instar nymph to help allow recognition of this species in the North American fauna.

The first documented U. S. specimen of *R. saturnius* was taken by Terry M. Allen in South Sacramento on 9 Oct. 1994. He later collected specimens on 9 Oct. 1995, 22 Sept. 1996, and 21 Nov. 1997. Additional material was taken by Larry A. Allen at Elk Grove, San Joaquin Co., Nov. 1996, April 1997, and August 1997. The August 1997 specimens collected by L. A. Allen (submitted to us by Alan Hardy, California Department of Agriculture, Sacramento) represent the material that first alerted us of a potential new U.S. and Western Hemisphere record for *R. saturnius*.

Since these initial collections, numerous other specimens have been discovered, including those taken in 1998 by L. A. Allen in yellow panel traps, Lindgren funnel traps for Asian longhorn beetle, Japanese beetle traps, and sticky pheromone traps set for monitoring gypsy moth, Oriental fruit moth, apple maggot, cherry fruit fly, Mediterranean fruit fly, and other common pests species in San Joaquin County.

Certainly, *R. saturnius* is not attracted to all of the specific pheromones used for monitoring these insects, but more simply these captures must reflect chance encounters by an abundant and widely dispersing bug. *Rhyparochromus saturnius* also has become a nuisance and frequently invades homes. It even has been found trapped in swimming pools. As common as this bug appears to be, however, it does not seem to be phototropic as are many other rhyparochromids. Not surprisingly, *R. saturnius* has attracted the attention of the newspaper and television media, and seems to have stimulated business for the local pest control industry, judging from the numerous pest control operator inquiries received (L. A. Allen, pers. comm.).

In August 1998, A. G. Wheeler, Jr. and the first author traveled to Stockton, California, to work with L. A. Allen to determine if *R. saturnius* was established. Our first few attempts to collect this species in the Stockton area indicated that it was common at most sites. At one locality (Stockton County Fairgrounds), *R. saturnius* was abundant on the ground under thick strawlike mats of a mowed grass or small grain. We estimate that 10 to 15 bugs per square foot (ca 0.09 m²) were present in some spots of an approximately two-acre field (nearly one hectare). At another site near the San Joaquin County Agriculture Commissioner's Building, several bugs were found under mats of a *Euphorbia* growing from cracks in sidewalks. Other collections in the Stockton area indicated that *R. saturnius* was generally common under mats of prostrate plants and grasses growing over curb sides. A few adults and late instars were found up on plants, although they were always more abundant on the ground. Specimens were found in a wide array of situations, including in and around patches of yellow starthistle, *Centaurea solstitialis* L. [Asteraceae], but we were unable to determine any particular host association.

Essentially, nothing is known about biology or hosts of *R. saturnius*, although its habits are presumed similar to those of other species in the genus. Another widespread species, *R. pini* (Linnaeus), is found in England on the ground beneath heather and heaths and among dead leaves and pine needles, where it feeds on fallen seeds. According to Southwood and Leston (1959), it overwinters as adults, emerging on mild days in spring. Mating occurs in late May and eggs are laid on the ground in litter or on woody stumps. First-generation adults begin appearing in early August, as do those of *R. saturnius* in California. Wagner (1961) reported *R. pini* under decaying logs and crawling on the ground, possibly associated with *Artemisia* (Asteraceae) and *Thymus* (Lamiaceae). Based on preliminary observations, it appears that *R. saturnius* overwinters as adults in protected places (L. A. Allen, pers. comm.) and is a generalist that feeds on numerous kinds of fallen seeds found over a wide range of dry or Mediterranean-like habitats typical of those found in central and southern California.

Rhyparochromus saturnius (Rossi)

(Figs. 1-5)

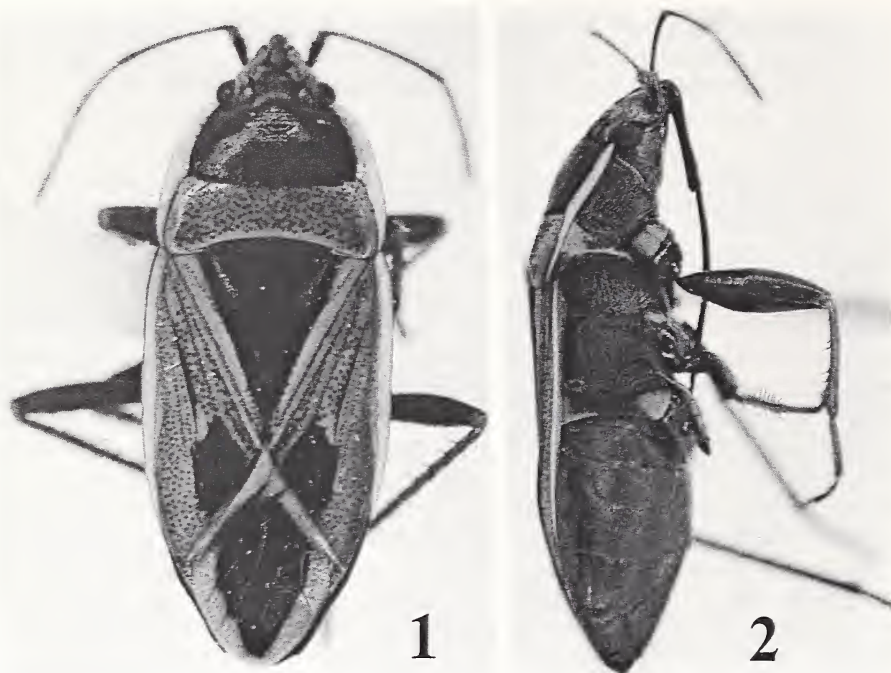
Cimex saturnius Rossi 1790: 245.

Pachymerus saturnius: Herrich-Schaeffer, 1835: 346.

Pachymerus rhombeus Fieber 1837: 346. Synonymized by Puton 1869: 16.

Pachymerus rhombimacula Costa 1843: 83. Synonymized by Puton 1874: 226.

Beosus saturnius: Fieber, 1861: 196.



Figs. 1, 2. *Rhyparochromus saturnius*. 1, Adult, dorsal aspect. 2, Adult, lateral aspect.

Aphanus saturnius: Lethierry and Severin 1894: 218.

Rhyparochromus (Xanthochilus) saturnius: Kiritschenko 1951: 286.

Raglius saturnius: Lindberg 1953: 84.

Rhyparochromus (Neoxanthochilus) saturnius: Wagner 1961: 94. See Slater (1964: 1334) for comprehensive bibliography.

Diagnosis. *Rhyparochromus saturnius* is readily distinguished from all other Nearctic Lygaeoidea by the combination of its relatively large size and distinct color pattern, particularly the brown-punctured hemelytra, with a large quadrate fuscous spot on the corium and a large rounded fuscous spot on the membrane (Figs. 1, 3). This species was previously placed in the paraphyletic family Lygaeidae, but is now assigned to the newly recognized Rhyparochromidae (Henry 1997), in the nominate subfamily Rhyparochrominae and tribe Rhyparochromini. Wagner (1961) placed *R. saturnius* in his subgenus *Neoxanthochilus*.

Description. *Adult male* ($n = 10$): Length 7.08–7.50 mm, width across middle of corium 2.60–2.80 mm. *Head*: Length 1.24–1.26 mm, width across eyes 1.30–1.38 mm, width of vertex 0.88–0.92 mm, width between ocelli 0.60–0.62 mm; black, thickly covered with recumbent silvery to golden, sericeous setae dorsally, more scattered to nearly glabrous on vertex near base; eight trichobothria present on dorsum, one on either side near posterior and anterior margins of eye, one on either side of tylus or clypeus, and the longest one on either side of vertex about the width of an eye toward middle. *Rostrum*: Length 4.20–4.24 mm (segment I, length 1.28–



Figs. 3, 4. *Rhyparochromus saturnius*. 3, Adult in ground litter. 4, Fifth-instar nymph on *Rumex* inflorescence.

1.32 mm; II, 1.32–1.36 mm; III, 1.04–1.08 mm; IV, 0.60–0.64 mm), extending to bases of metacoxae. *Antenna*: Segment I, length 0.52–0.56 mm; II, 1.34–1.36 mm; III, 1.08–1.18 mm; IV, 1.18–1.20 mm; reddish brown, with extreme bases of segments II–IV and basal $\frac{2}{3}$ of I black. *Pronotum*: Length 1.52–1.60 mm, basal width 2.32–2.56 mm, shiny, glabrous; anterior lobe black, impunctate; posterior lobe pale brown or tan, with scattered brown punctures; lateral explanate margins impunctate,



Fig. 5. County distribution of *Rhyarochromus saturnius* in California.

pale brown or tan; scutellum length 1.56–1.68 mm, basal width 1.40–1.44 mm, uniformly black and finely punctate. *Hemelytron*: Glabrous, pale brown or tan, with inner half of clavus and a large quadrate spot at inner angle of corium black, uniformly scattered with brown punctures, including linearly along all major veins; embolium impunctate, uniformly pale brown or tan; membrane white, with a large black central spot. *Ventral surface*: Mostly black, all acetabula and posterior margins of pro- and metapleura pale brown or tan. *Legs*: Femora black, except narrowly reddish-brown apices; tibiae reddish brown, metatibia often becoming more fuscous, all spines black; tarsi and claws reddish brown.

Adult female (n = 10; figs. 1–3): Length 7.08–8.08 mm, width across middle of corium 2.56–2.88 mm. *Head*: Length 1.20–1.43 mm, width 1.32–1.46 mm, vertex

0.88–0.96 mm. *Rostrum*: Length 4.28–4.58 mm (segment I, 1.28–1.42 mm; II, 1.40–1.44 mm; III, 1.04–1.12 mm; IV 0.60–0.68 mm). *Antenna*: Segment I, length 0.50–0.56 mm; II, 1.24–1.36 mm; III, 1.00–1.20 mm; IV, 1.02–1.12 mm. *Pronotum*: Length 1.50–1.68 mm, basal width 2.34–2.72 mm; scutellum length 1.58–1.72 mm, basal width 1.36–1.60 mm.

Fifth Instar (n = 3; fig. 4): Length 5.08–5.83 mm. Head black, eyes red. Antenna yellowish brown, segment IV darker brown, bases of segments I and III dark brown or black. Rostrum fuscous, extending to apices of metacoxae. Pronotum quadrate, lateral margins narrowly explanate; dark brown to black, with narrow sublateral margins and a wide band across base yellowish brown; scutellar area dark brown with median line narrowly yellow; wing pads extending to fifth abdominal segment, pale yellowish brown, with a broad dark-brown stripe through middle. Abdominal dorsum gray to dark brown, accented with red streaks, lateral margins and a quadrate spot on either side of abdominal scent gland openings II and III pale yellow to nearly white, scent gland opening I (basal opening) surrounded by a large quadrate fuscous marking (much larger than markings on II and III) and bordered on either side by a red-centered white band extending transversely to lateral margins; scent gland openings present between segments 4–5, 5–6, and 6–7. Ventral surface of head and thorax fuscous to black; abdominal venter grayish brown, streaked with red; segments 6, 7, and 8 each with a large, round, dark-brown spot along median line. Legs uniformly fuscous or dark brown.

Remarks. It is not surprising that *R. saturnius* has become established in California. Over the past nine years, it has been intercepted by APHIS/PPQ personnel more than 40 times at U. S. ports of entry, most frequently at Houston, Miami, and New York, primarily on pallets of tile and other ceramic products. Italy represents the origin of all but two of these interceptions. One non-Italian interception came from Spain and the other from the United Kingdom, the latter undoubtedly representing an intermediate stop from the Mediterranean area given that *R. saturnius* is not known to occur in the UK (Southwood and Leston 1959). Only three interceptions were from California ports, one at Long Beach from Italy in 1996 and two at San Diego in 1998, listed as originating in Mexico. If the latter records are accurate, they may indicate that *R. saturnius* is also established in Mexico. Our efforts to determine the origin of these Mexican shipments were unsuccessful.

Three other rhyparochromids, two of which are adventive in North America, also were found at several sites during our survey, but they were never as common as *R. saturnius*. *Emblethis vicarius* Horváth (Gonianotini), widespread in North, Central, and South America (Ashlock and Slater 1988), was found in three counties (Fresno, Lake, and San Joaquin); *Lamprodema maura* (Fabricius) (Megalonotini), known in North America only from California and Nova Scotia (Ashlock 1977) was collected in Contra Costa County; and *Megalonotus sabulicola* (Thomson) (Megalonotini), known in this hemisphere from the eastern and western United States and from Canada (Wheeler 1989, Asquith and Lattin 1991), was taken in four counties (Calaveras, Contra Costa, San Joaquin, and Yolo). From *R. saturnius*, *L. maura* is differentiated by the small size (4.20 mm or less), polished dorsum, black head, pronotum, and scutellum, fuscureddish hemelytra with a paler clavus, and pale membrane with a dark central cloud; *M. sabulicola* is distinguished by its small size (less than 5.50 mm), black head and pronotum, and fuscureddish hemelytra; and *E. vi-*

carius, slightly smaller than *R. saturnius*, is uniformly pale brown or tan, marked only with tiny dark spots over most of the dorsum, and the lateral margins of the pronotum and hemelytra are broadly explanate.

Distribution. *Rhyparochromus saturnius* is reported from Algeria, Bulgaria, Crimea, Egypt, France (including Malta), Germany, Greece, Israel, Italy (including Sardinia and Sicily), Morocco, Portugal, Russia, Spain (including Canary Islands), Syria, Tunisia, Turkey, and Yugoslavia (Slater 1964).

California (Fig. 5), including 17 counties (Alameda, Calaveras, Contra Costa, Fresno, Kern, Lake, Mariposa, Merced, Sacramento, San Joaquin, San Benito, Santa Barbara, Santa Clara, Solano, Stanislaus, Tuolumne, and Yolo counties), is a new record for the United States and the Western Hemisphere. Records from Kern and Santa Barbara counties are based on identifications furnished by T. A. Allen and are not listed below.

Material examined (all in National Museum of Natural History [NMNH] collection, Washington, D. C., except as noted). CALIFORNIA: **Alameda Co.:** 1 ♂, Livermore, 480', at N. Vasio Rd. & Dalton Ave., 37°44'01"N, 121°43'51"W, 14 Aug. 1998, T. J. Henry and A. G. Wheeler, Jr. [TJH & AGW]. **Calaveras Co.:** 3 ♂♂, 8 ♀♀, Valley Springs, 11–13 August 1998, L. A. Allen. **Contra Costa Co.:** 1 ♀, Near Discovery Bay, Rt. 4, 37°53'23"N, 121°37'24"W, 14 Aug. 1998, TJH & AGW. **Fresno Co.:** 5 ♂♂, 1 ♀, Rt. 33, at Firebaugh, 36°51'43"N, 120°27'44"W, TJH & AGW, under mats of *Chenopodium* sp. **Lake Co.:** 1 ♂ (5 late-instar nymphs), Rt. 29, Middletown, 10 Aug. 1998, AGW, on head of *Rumex crispus* L. [Polygonaceae]. **Mariposa Co.:** 2 specimens, Red Hills Recreation Area, June 1997, in pitfall trap, M. A. Wall (M.A. Wall collection). **Merced Co.:** 1 ♂, at Santa Nella, off Rt 5, 37°05'57"N, 121°00'54"W, 14 Aug. 1998, TJH & AGW. **Sacramento Co.:** 2 (specimens based on field notes, sex not determined), Hazelton St., near California Dept. Agric. Bldg., 11 Aug. 1998, L. A. Allen, TJH, & AGW. **San Joaquin Co.:** 30 ♂♂, 27 ♀♀, Stockton, San Joaquin County Fairgrounds, Airport Rd. & Charter, 37°56'23"N, 121°16'11"W, 11–13 Aug. 1998, TJH & AGW; 1 ♂, Stockton Airport, 12 Aug. 1998, L. A. Allen, TJH, & AGW; 1 ♀, Port of Stockton, 37°56'58"N, 121°19'56"W, 12 Aug. 1998, L. A. Allen, TJH, & AGW. **San Benito Co.:** 1 ♀ (1 late-instar nymph), Rt. 156, toward Hollister, near Santa Clara Co. line, 36°57'29"N, 121°23'00"W, TJH & AGW. **Santa Clara Co.:** 1 ♀, Rt. 152, 2 mi. W of Merced Co. line, 37°03'41"N, 121°13'50"W, TJH & AGW. **Solano Co.:** 1 ♂, Dixon, 38°27'28"N, 121°50'30"W, 12 Aug. 1998, L. A. Allen, TJH, & AGW. **Stanislaus Co.:** 1 ♀, at Westley Rd, Rt. 5, 37°32'31"N, 121°15'58"W, 14 Aug. 1998, TJH & AGW. **Tuolumne Co.:** 1 ♀, S. of "Chinese Camp," June 1997, M. A. Wall. **Yolo Co.:** 1 ♀, Port of Sacramento, West Sacramento, 38°33'42"N, 121°32'27"W, 13 Aug. 1998, L. A. Allen, TJH, & AGW.

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